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A pan-Asian survey of risk perception, attitudes and practices associated with live animal markets

Introduction

Highly pathogenic avian influenza (HPAI) of the H5N1 virus is endemic in many countries.^{1,2} Asia generates 81% of egg production of all developing countries.³ Day-old broiler seed chick exports, the adult bird trade, and wild birds may all facilitate HPAI distribution.⁴ Slaughter/consumption of infected poultry accounts for most human HPAI infections,¹ and live poultry retail and domestic husbandry makes documenting related human behaviour and perceptions important.⁴ Preventive practices require population adherence to be effective. Beliefs about why outbreaks happen (causal attributions) and their control (control beliefs) can modulate adherence.⁵ Studies of individual attributions for diseases often differ from pathophysiological causes of those diseases. When this happens, treatment adherence declines.^{6,7} No reports we have seen describing causal attributions for H5N1 HPAI, though several 'knowledge, attitude, practice' studies exist.⁸⁻¹³ Most of these have failed to address lay explanation of HPAI. We describe causal attributions for HPAI among live poultry, consumers, retailers and breeders in Vietnam, Thailand, Guangzhou and Hong Kong, regions historically affected by H5N1 HPAI.

Methods

In Vietnam, two communes within Chuong My province, Chuc Son (urban) and Dai Yen (rural) formed the sample frame. Purposive sampling criteria were formerly epidemic/non-epidemic area; rural/urban residence; gender, age and chicken farmer/backyard raiser/retailer/consumer/non-consumer. Individual households were identified randomly from commune residence lists and approached for interview. Trained local health bureau interviewers completed one face-to-face interview per household between mid-February and mid-March 2006.

In Thailand, five districts in Suphanburi province formed the sample frame: Nongyasai (rural), Doembangnanbuat (rural), Songpinong (rural), Uthong (rural) and Muangsuphanburi (rural-urban). Within districts, stratified cluster sampling selected interviewees from two large and two smaller poultry farms, two retailers and two consumers. The Institute for Health research staff, Chulalongkorn University, conducted interviews from October to December 2006.

In Guangzhou, two-tiered stratified cluster sampling of metropolitan households (2 723 288) were used according to residential and occupational criteria from records of the occupational health unit, No. 12 Peoples' Hospital, Guangzhou. Kish-grid-derived face-to-face interviews were performed between March and May 2007.

In Hong Kong, a pre-existing random sample (n=1760) was used. Purposive sampling by gender, age, educational level and perceived risk from live poultry sales identified adults aged above 17 years and selected by Kish-grid to complete contract telephone interviews between mid-December 2005 and mid-February 2006.

None of the regions had H5N1 HPAI outbreaks within 6 months before

Key Messages

1. Causal attributions for highly pathogenic avian influenza (HPAI) of the H5N1 virus among live poultry, consumers, retailers and breeders in Vietnam, Thailand, Guangzhou and Hong Kong were studied.
2. Three main themes embodying lay explanation for the causes of H5N1 HPAI emerged: viruses, husbandry-related factors, and vulnerability factors.
3. A deeper understanding of the perceptions of risks, biases, causal attributions, and both the facilitators and barriers to change is needed for planning effective changes in health-related behaviour.

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or during the study. Because qualitative interviewing inexperience affects data quality, in Thailand we adopted a semi-structured interview approach using a set of questions to minimise interviewer variation. Pre-specified criteria-guided questions were used to initiate data collection. During a longer interview, respondents were asked about the causes of the HPAI epidemic.

Results

Of 123 interviews performed, there were 38 Vietnamese (11 poultry buyers, 22 domestic or commercial poultry keepers, and five poultry sellers), 20 Hong Kong Chinese poultry consumers aged 18 to 73 years, 40 Thai commercial or domestic poultry breeders, retailers, consumers or non-consumers, and 25 Mainland Chinese Guangzhou residents of various backgrounds. Three main themes embodying lay explanation for the causes of H5N1 HPAI emerged: viruses, husbandry-related factors and vulnerability factors.

Viruses

The viruses theme comprised two main components: old diseases and new diseases. In old diseases, many rural respondents believed that H5N1 HPAI was nothing new, another periodic disease affecting animals as occurred from time to time and of little concern. Traditional zoonotic epidemics were ordinary problems and were often undifferentiated from each other. *"I think last time my chickens got infected with cholera. In my opinion, bird flu and cholera are the same disease. Do you think the bird flu is a new disease in Thailand? No."* (T9)

Several respondents felt that the re-interpretation or discovery by science of these old diseases did nothing to alter the fact that this was part of farming life. *"I don't know the reason why the bird flu epidemic has occurred. As far as I know, the bird flu epidemic has existed for a long time but people haven't detected it until recently. In the past, it was less serious and people did not know that the flu can be transmitted from poultry to humans."* (V27)

With respect to new diseases, few respondents identified H5N1 HPAI as novel, although some alluded to mutations. However, while these views corresponded to contemporary scientific opinion, they were not widespread. *"I heard that there is a shuffling effect from time to time, I mean, made it to be a combination of H5N1."* (H16)

Husbandry practices

Poor husbandry was highly culpable, involving overcrowding, antibiotic resistance, cross infection, and keeper and commercial behaviour. Many interviewees thought poultry breeds, commercial feed and additives were core components of H5N1 HPAI emergence. These views were widespread among rural and urban respondents. Keeper and commercial behaviour encapsulated poor husbandry, sanitation and lax scrutiny of imported poultry strains. *"I think that there were some sources of infection*

such as unsafe breeding facilities, outside impacts, illegal selling, people's lack of awareness, insects, and birds. The most important source is people's lack of awareness. It is the breeders who are responsible for poultry becoming infected. They should take preventive measures when the environment is unsafe." (V15)

Commercial practices of husbandry were also implicated. In particular, both rural and urban dwellers often raise the issue of maximising profit by intensively raising fast-growing birds fed on poor-quality feedstuffs, enhanced by growth-promoting antibiotics and sometimes fluid-retaining hormones as well. *"I think those people want to earn quick money too much...and I also think there are some illegal merchants...I think they really want to earn quick money, and the opportunists are really crucial."* (H1)

Overcrowding within the coops was considered to be important and often linked to poor ventilation and poor sanitation—as being risk factors for H5N1 HPAI outbreaks. *"I think it is too stuffy...the quality of the air is bad...and the sanitary conditions of the whole farm are not so good.... Thus the virus is born."* (H10)

Cross-infection was widely commented on by younger, more educated farmers. *"There was no problem in the second epidemic, but this area was designated yellow. The third time this area became red zone, some of the village farmers raised baby ducks in the field...only people in this area who raise poultry...didn't have much experience. What happened? A lot of rain then the duck pen got wet, the owner of the ducks brought them to the dirty area, so the baby ducks got diarrhoea, unfortunately. Is that so? After that the baby ducks died near the rice field. The owner didn't see some chickens [were there]. Some ducks died in the water, then the owner brought the ducks again, after that they got infected."* (T29)

Traditional varieties of poultry were generally viewed as hardier than contemporary commercial broiler breeds. Poultry weakness was exacerbated by both poor housing and feeding practices. *"Because of mass production breeding, it is very hard to choose portly ducks as in the past. Nowadays, ducks are mainly raised by combination of free roaming and mass production breeding. This model of raising is called semi-mass production."* (V38)

Many respondents considered the use of industrial mash feed in husbandry and retail outlets weaken chickens, but such feed was popular because of its convenience and low costs. Most small-scale farmers however rejected this feed, believing it to increase vulnerability to disease, and preferring to use rice, paddy (unhusked rice) or other grain instead. *"The poultry were fed with natural feedstuff before, but the feedstuff now has added catalyst...they don't use the correct ways to feed, but use some chemical ways.... So the chickens change; they do not grow normally, and are not healthy."* (H3)

Vulnerability and environmental factors

Factors increasing vulnerability to H5N1 HPAI included: the weather, pollution, and wild birds. This category featured external causal agents of transmission and spread, not under the control of man. Weather was widely cited as a causal factor—most respondents mentioning weather cited change of season as the most likely time for H5N1 HPAI outbreaks. *“It is easy for the epidemic to occur, especially in the transitional time from one season to another, for example, from summer to autumn or from autumn to winter. In recent years, chickens are easily infected in this transitional time. I don’t know whether it was due to bird flu virus H5N1 or not.”* (V27)

Pollution, in contrast to weather, was cited as a component that included industrial pollutants and agricultural practices, including pesticide use. *“In my opinion, there are a lot of reasons why it occurs. Maybe it’s because of the industrialisation process and climate changes. The process of industrialisation results in more dust and pollution.”* (V38)

Wild birds were often implicated, but more often they too were victims. Several respondents mentioned how wild birds died off suddenly, whereas others cited migratory behaviour as being responsible. *“Pigeons died before other birds. In my village, there are a lot of pigeons. There is a house (in the village); the owner lives in Bangkok and doesn’t come here. Many pigeons live in that. One day they dropped dead, but there are still lots of them. They breed very fast.”* (T18)

Not surprisingly, public knowledge of H5N1 HPAI and the impact of health education on poultry practices remains modest.⁸⁻¹³ Simply providing information takes no account of a population’s causal attributions, perceived risks,^{4,14,15} perceptual bias¹⁶ or structural determinants of behaviour, and is unlikely to result in significant and sustained change. For this reason, a deeper understanding of the perceptions of risk, biases, causal attributions, and both the facilitators and barriers to change is needed for planning effective change of health-related behaviour.

Discussion

Many rural dwellers view H5N1 HPAI as yet another periodic but natural zoonosis, many of which have occurred in the past and life still went on largely unaffected. Poultry died, people ate the poultry, most were unaffected. There was a view that rural dwellers felt the urban dwellers had suddenly ‘discovered’ these diseases and felt threatened. Because of this, wide-scale culling became the response common to outbreaks. However, within many rural villages, residents are not motivated to change their husbandry and other relevant practices to protect themselves where they do not see any threat. Health education efforts that fail to take heed of prevailing views are likely to remain ineffectual.

Many respondents denied threats from these ‘natural’

zoonoses and this often removed any justification for precautionary practices such as using personal protective equipment. These perceptions remain common in rural areas of South East Asia, and pose a significant barrier to the adoption of hygienic practices, particularly among small-scale farmers with small investment.

The lay explanations people hold for why H5N1 HPAI has occurred are unlikely to change only by providing information, unless active epidemics increase the threat, which then has to be avoided. Both non-congruent information (contradicts or challenges beliefs) and congruent information (agrees with beliefs) are received and recalled differently, with the former being perceived as erroneous and subsequently poorly recalled.¹⁶ Frequency of exposure can enhance acceptability of messages. More frequently encountered messages,^{17,18} especially those presented by known and popular individuals (hence media and sports personalities), or those perceived to be competent¹⁶ can enhance message acceptability. The more cognitive processing a message receives, the more likely it will be effective if prior conditions are in place.¹⁶ Anxiety generation can be helpful in changing behaviour. However, if no anxiety is aroused, the message may be dismissed as irrelevant.^{16,19} This seems to be happening among a large segment of rural respondents. Despite efforts to optimise health messages, they remain of limited effectiveness. However, recent evidence suggests that perceived risk enhancement is associated with changed risk-taking behaviour towards live poultry.¹⁵ This approach is consistent with earlier work, and suggests that addressing and then redirecting perceptions of H5N1 HPAI away from it being just another manifestation of an old problem is critical. Emphasising the potential harm may be an important strategy to help reduce risky behaviour around live poultry.

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